

WHAT IS CLAIMED IS:

1. A system, comprising:

a control card, comprising:

a control processor to execute a control portion of link management;

5 a line card, comprising:

a line processor to execute an offload portion of link management;

a communications port to allow the system to access a high-capacity communications link; and

a backplane to allow the control card and the line card to communicate.

10 2. The network device of claim 1, the control processor further comprising a general-purpose processor.

3. The network device of claim 1, the control processor further comprising an Intel Architecture processor.

4. The network device of claim 1, the line processor further comprising a network-enabled processor.

15 5. The network device of claim 1, the line processor further comprising an Intel IXP processor.

6. The network device of claim 4, the line processor further comprising at least one reduced instruction set microengine.

20 7. The network device of claim 1, the backplane further comprising a physical backplane connection.

8. The network device of claim 1, the backplane further comprising a network.

9. A method of managing links in network, comprising:

receiving traffic link data about aggregation of data links into channels from a control card;

25 exchanging control link status messages with adjacent peers;

monitoring synchronization of data links in a channel;
determining if there has been a control link or data link failure; and
filtering and validating control packets relating to link management.

10. The method of claim 9, comprising identifying link configuration changes and notifying
the control card.

5 11. The method of claim 9, receiving traffic link data further comprising receiving traffic
engineered link data in accordance with the Link Management Protocol.

12. The method of claim 9, exchanging control link status further comprising exchanging
link status messages.

10 13. The method of claim 9, monitoring synchronization of data links further comprising:
detecting that a data link has lost synchronization; and
notifying the control card of the loss.

14. The method of claim 9, determining if there has been a control link or data link failure
further comprising:

15 detecting a loss of connectivity in a control channel;
causing an event that notifies the control card; and
setting a status flag indicating that the control channel has failed.

15. The method of claim 9, determining if there has been a control link or data link failure,
further comprising:

20 determining that a local node is not responding to data link verification message; and
notifying the control card of a data link failure.

16. A method of establishing an offload portion of link management, comprising:

25 initializing a line card;
registering an offload portion of a protocol to be executed by the line-card with a
central registration point;
setting up a control connection with a control card;

- transmitting resource data to the control card;
- receiving configuration information from the control card including information about data links aggregated links into channels;
- establishing connections with adjacent peers for each link; and
- 5 maintaining the links.
17. The method of claim 16, transmitting resource data further comprising transmitting physical link data, offload-controlled interfaces and processing resources.
18. The method of claim 16, establishing connections further comprising exchanging link status messages.
- 10 19. The method of claim 16, establishing connections further comprising exchanging messages to verify data links.
20. The method of claim 16, establishing connections further comprising exchanging synchronization messages.
21. The method of claim 16, maintaining the links further comprising:
- 15 monitoring control and data links for failures;
- identifying changes in link configurations; and
- tracking synchronization in the data links.
22. A method of establishing a control portion of link management, comprising:
- initializing a control card;
- 20 registering a link management control portion to be executed by the control card with a central registration point;
- setting up control connections with line-cards executing offload portions of link management;
- aggregating data links into channels; and
- 25 configuring the line cards including providing aggregation information

23. The method of claim 22, comprising receiving messages from the offload portions of link management.
24. The method of claim 23, comprising updating configuration data based upon the messages.
- 5 25. An article of machine-readable media containing instructions that, when executed, cause the machine to:
- receive traffic link data about aggregation of data links into channels from a control card;
- exchange control link status messages with adjacent peers;
- 10 monitor synchronization of data links in a channel;
- determine if there has been a control link or data link failure; and
- filter and validate control packets relating to link management.
26. The article of claim 25, the instructions further causing the machine to identify link configuration changes and notify the control card.
- 15 27. The article of claim 25, the instructions causing the machine to exchange control link status further causing the machine to exchange HELLO messages in accordance with the Link Management Protocol.
28. The article of claim 25, the instructions causing the machine to monitor synchronization of data links further causing the machine to:
- 20 detect that a data link has lost synchronization; and
- notify the control card of the loss.
29. The article of claim 25, the instructions causing the machine to determine if there has been a control link or data link failure further causing the machine to:
- detect a loss of connectivity in a control channel;
- 25 cause an event that notifies the control card; and
- set a status flag indicating that the control channel has failed.

30. The article of claim 25, the instructions causing the machine to determine if there has been a control link or data link failure, further causing the machine to:
determine that a local node is not responding to data link verification message; and
notify the control card of a data link failure.

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